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AUTHOR Bent, Joanne
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ABSTRACT

A study investigated the readability levels of different editions of six college textbooks published in the 1950s, 1960s, and 1970s ("A History of Civilization," "Government by the People," "Economics," "Introduction to Modern Business," "Introduction to Psychology," and "Pscyhology"). The study also compared the number of pages and chapters appearing in the various editions of the textbooks over the years. The results showed that the textbooks published in the 1950s had smaller print, more pages, and more print per page. They also used longer words and more words per sentence and little color or illustrations and maps. The books of the 1960s had less print per page and more margin space than did those of the 1950s. The books published in the 1970s used larger print, shorter sentences and shorter, easier words. They also used more maps, glossaries, and illustrations than did the earlier books. (FL)

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THE READABILITY OF COLLEGE TEXTBOOKS

1954-- -- --1979

by

Joanne Bent

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INTRODUCTION

"TEXTS ARE GETTING TOUGHER ALL THE TIME"

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"COLLEGE TEXTBOOKS BEING SIMPLIFIED TO MEET THE NEEDS OF THE POOR READER"

The above are two contradictory headlines which have appeared in newspapers in the last few years.

In 1959, Fine wrote that college textbooks are much harder to read and understand than high school books, therefore the student will have to adjust to the new demands made on him or her.

Armbruster, in a New York Times article in 1977, stated that many high school graduates entering college could not understand the textbooks that high school graduates formerly were able to read. As a result, textbooks, he noted are being scaled down to this lower capacity with fewer abstractions and more repetition of concepts.

In a New York Times article (1974) the reason publishers gave for simplifying textbooks was that the books were too hard especially for community college students.

In a study done by Cline (1972), the textbooks used by community college students were shown to be above the reading capacity of fifty to seventy five per cent of the students. In another study done by Major and Collette (1961) using college Biology textbooks, it was found that the books were above the ability levels of the students for whom they were chosen.

Which point is correct? Are college textbooks getting easier? If this is so, then what are the reasons for the high proportion of student failures? There may be a gap in study skills training in high school. It may also be due to a large proportion of students who are entering college who would not have been accepted several years ago. Another possibility is that recent editions of textbooks are more difficult than earlier editions. It could be concluded that publishers are issuing misstatements and that further development of reading skills at the elementary and high school level is necessary for achievement in college.

HYPOTHESIS

What is the readability of textbooks used at the college level, and is there any significant difference in the readability of several editions of the same text over a period of years? To determine the readability, which is an estimate of the difficulty of reading material in terms of grade level, a readability formula will be used.

RELATED LITERATURE

People have been concerned with readability since symbols were first used and recorded. It was noted in the Bible, I Corinthians, that understanding speech was necessary. In 900 A.D. the Talmudists made word and idea counts in order to use frequency of occurrence to distinguish usual from unusual meanings.

In the twenties the most used and adequate criteria for the construction of reading formulas was provided by librarians who had to supply readable material for adults. At this time also, The Standard Test Lessons in Reading was created by McCall and Crabbs. Lively and Pressey developed the first method of measuring readability in 1923. Formulas developed by Dale and Chall (1948) and Spache (1953) were rather lengthly and difficult to compute. In 1968 Fry's Formula which is simpler and easier to utilize was developed.

These readability formulas are used as predictive devices. In general they use such factors as the number of unfamiliar words, the number of syllables, and/or the number of sentences in a specified sample with several samplings per text.

PROCEDURES

The Fry Readability Formula is the one that will be

used in this study. Factors such as interest, motivation, comprehension of subject areas, language competence, and experiential backgrounds of the readers in relation to the texts are not considered in this study. The textbooks selected to meet the purposes of this study are only a small percentage of those used by college students over the years.

To determine whether college textbooks have changed over the years, the following procedures were used.

Several editions of college textbooks used by colleges and universities the past years were evaluated. The Fry Readability Formula Extended was used to make the evaluation. This entailed taking five one hundred word sections from various points within the book. The number of syllables and the number of sentences of each section was counted. By plotting the syllable count and the sentence count on a chart, a readability level was found for each book.

Other factors that were considered in the evaluation of the textbooks were the number of pages, vocabulary load, and material variation.

Although Prentice-Hall reported that it bases readability of a book on organization, language, and relevance, the factors of organization or relevance could not be considered since no objective method of assessment was found possible.

RESULTS

Table one, "A Comparison of College Textbooks" illustrates the approximate grade levels for six college textbooks published in the last twenty years.

The approximate reading levels were found by applying the Fry Readability Formula Extended. Each text had five one hundred word samples upon which the number of sentences and the number of syllables were found, and the average was plotted on a graph.

As noted in table one, "A Comparison of College Textbooks" there is a striking difference in the number of pages and the number of chapters within each textbook.

There is a tendency to use fewer pages to cover the material encompassed by the text though this is not true universally. The text Introduction To Modern Business is the notable exception. There is also a tendency to utilize fewer chapters.

Readabilities, comparing the past edition with the latest editions, indicate that texts generally became more difficult. Two show no change in readability.

Table 1

A Comparison of College Textbooks

	Number of Pages	Number of Chapters	Readabilities
A History Of Civilization			
1960	656	15	8
1967	631	15	12
1971	575	15	12
Government By The People			
1954	978	34	13
1957	902	35	15
1966	633	26	15
1978	527	23	13
Economics			
1954	707	39	12
1960	841	42	13
1977	689	47	13
Introduction To Modern Business			
1959	617	24	15
1964	643	26	16
1970	649	23	11
1977	647	23	17
Introduction To Psychology			
1967	672	24	12
1979	637	18	16
Psychology			
1971	940	19	13
1978	589	17	13

DISCUSSION

The textbooks published in the nineteen fifties had smaller print, more pages, and more print per page. There were longer words used and more words per sentence. There was very little color used and few illustrations and maps.

In the textbooks of the nineteen sixties there was less print per page and more white margins left on the page. There was a tendency to include more social issues in the

books at this time.

The books published in the nineteen seventies used larger print, shorter, more easily understood words, and often repetition of words within the same paragraph, as well as shorter sentences. There are more graphs, maps, glossaries, and illustrations used in all of the books than in previous years.

In the 1977 edition of Economics the authors have stated that the book is written for students, not teachers, and it minimizes the technical apparatus and emphasizes a few key items which the student can apply in the real world.

The 1979 edition of Introduction To Psychology had the difficult material presented at the beginning of the book, so that the student would have less difficulty later in the course. It was written for student interests. The chapters had been updated and integrated from previous years.

The use of paperback books as supplementary reading material was added in the seventies.

The authors of most of the books pointed out that course instructors were responsible for how and when the material was presented in class.

One of the publishers, Prentice-Hall Inc. stated that textbooks are effective if the students are interested, can read the book, and understand what they read. "The books rely on three main devices to achieve readability: organization, language, and relevance."

CONCLUSIONS

The purpose of this study was to determine the readability level of college textbooks used in the last twenty years. After comparing several editions of college textbooks it was found that they have become more difficult.

The Fry Readability Formula Extended was used to determine the readability levels of eighteen college textbooks. The results showed that in most cases the readability of the books has become more difficult. Two books showed no change in readability from earlier editions.

In the introduction to many of the textbooks the author emphasized the fact that course instructors are responsible for the manner in which the book is used. This depends on the course objectives, the time allotted for the course, and the ability of the students.

Fry maintains that although a book at a sixteenth readability level is indeed more difficult than one at a fourteenth readability level, the suitability of the book for a college sophomore or senior is a matter of opinion. He also stated that high motivation overcomes a high readability level, but low motivation requires a low readability level. There are great divergencies in the college student population now, and interest and motivation play an important role in learning.

There needs to be a definition of terms in what makes a book "easy" or "hard". The readability level is what

makes a book more easily understood and that is what this study is based on. The newer textbooks, however, are easier in style. There is larger print, less print on a page, fewer technical terms, repetition of words, shorter sentences and more conciseness. By making the books more attractive through the use of color, graphs, illustrations, and pictures, they become more appealing to the students.

Since the readability of the textbooks has become more difficult, some measures should be taken in the years previous to college entrance to ensure future success. Reading will have to be improved at the secondary school level by having every content area teacher also become a reading teacher. This can be done by in-service training. Study skills of the students would also have to be improved.

In colleges, instructors might use earlier editions of the textbooks which are easier. Audio-visual aids, supplementary materials, and study aids could also be used to aid the students. Several books, notably Economics, are written on two tracks, one for advanced students and the other where just the basic facts have to be learned.

The key is time--the instructor has to take the time to assess the readability of the textbooks, discover the ability of the students, gear his/her lessons accordingly, and provide motivation.

With more awareness of the readability level of textbooks, and students intellectual level, instruction on the part of secondary school and college teachers can be

modified to improve reading ability and study skills. Another alternative might be for the publishers to lower the readability level of the textbooks.

Related Research

The publishers of college textbooks have been in the news in the last few years because the readability of their books and the reading levels of the students for whom they've been provided, has been questioned. Students and teachers depend on publishers and libraries for the thousands of books they read.

In 1974, a New York Times article pointed out that publishers of college textbooks were simplifying the language in the books to meet the needs of the college students who couldn't read.

In a telephone interview in 1977, Bertalan was told by a marketing supervisor for a publishing company, that community college science books were geared for the tenth grade readability level.

A report of the Commission on the Humanities in 1980, emphasized the fact that textbooks are written down to easier levels of language proficiency so that fewer demands are placed on students to meet acceptable standards of academic achievement.

Textbooks must interest and challenge students, not bore or coddle them. A good textbook should speed up teaching and learning of a subject. It should also encourage the

production-correction process between the student and teacher. The book should help a student feel that he/she can master the basics of a subject and make future progress on his/her own.

It may be interesting to note, that in 1961 and also 1980, authors wrote that American college students tended to pursue mediocrity rather than excellence. During these years also, there were a large proportion of college students who were deficient in reading and study skills.

There have been many studies that have noted the declining reading levels of college students. Many of these have shown a variable readability level in college textbooks, although many publishers claim this is not necessarily true.

This study has been undertaken to find whether textbooks have become harder, remained the same, or as some publishers claim, become easier.

Some of the definitions necessary for understanding a readability study are:

> Readability which is the ease or difficulty of reading material which may be referred to as grade level equivalent.
>
> Readability Formula which is a method of measurement intended as a predictive device. It estimates the probable success a reader will have in reading and understanding a piece of writing.

Textbook is a book dealing with a definite subject of study, systematically arranged, and intended for use at a specified level of instruction, and used as a principal source of study material.

Word is a symbol or group of symbols bounded by a blank space on either side.

People have been interested in readability since symbols were first used and recorded. It began with the Bible. Idea and word counts were made by the Talmudists in 900 A.D. since the religious writers were the most literate persons of their times.

Educators were the next people interested in readability. In 1840 vocabulary understanding was evident in the McGuffey Readers. Vocabulary was also important in Rubakin's work in 1889 on word lists. In 1898 Kaeding related vocabulary to reading difficulty and constructed word counts.

Thorndike's The Teachers Word Book published in 1921 was an important event because it influenced the teaching of vocabulary and was the basis of Lively and Pressey's work. In 1923 they developed the first method of measuring readability. Washburnes and Vogels work was important because it not only used outside criterion but also provided a base upon which others constructed their own readability formulas.

In 1925 there was widespread interest initiated by librarians to provide readable materials for adults. This culminated in the formation of a Commission on the Library

and Adult Education. McCall and Crabbs published their Standard Test Lessons in Reading in 1925 and it became the criteria for the construction of some readability formulas.

Several readability studies were done in 1934. Ojemanns study concerned adult reading abilities; Dale and Tyler's study focused on adults, and McClusky's study dealt with the difficulty of subject matter in books. Gray and Leary's study was the most extensive and was concerned with what made a book readable to adults of limited ability. Lorge's formula, which appeared in 1939, was more efficient than previous ones because it used only three elements. It was also used in other fields. The best known readability formulas were Flesch's Reading Ease and Human Interest. He popularized the word readability in other areas.

In 1948 Dale and Chall developed a formula that was simpler and more predictive than others. This was intended to be used primarily with adult materials. A formula using childrens' materials also appeared in 1948. It was formulated by Dolch. He concentrated his study on the way material was presented in textbooks. Wheeler and Wheelers' study on childrens' textbooks depended mainly on Thorndike's word counts.

In 1952 Gunning devised a formula similar to Flesch's Reading East Formula. It was called the Fog Index, and is the reading grade level required for understanding the material.

A formula for use with primary grade reading materials was developed by Spache in 1953. Another was that of

Wheeler and Smith which was similar not only to Spache's but also to Gunnings.

One study indicated that the Dale-Chall Formula was best for predicting reading difficulty, and the Flesch Formula was best of those not using a word list.

The Fry Readability Formula appeared in the late sixties. The purpose of it is to aid teachers and editors, to help children and adults read better by giving them material on proper difficulty level. The Fry Formula is used for primary, secondary, and college materials. It is the least time consuming and the most accurate of the previous formulas. Two factors are used to determine grade reading level: the average number of sentences per hundred words, and the average number of syllables per hundred words. The interim point of these two factors on a graph denotes the grade level. The $SE_{m.}$ is about 0.5, which means that in every two out of three cases the true grade level score may fall within a one year range.

Fry, upon extending the graph through college years made the point that a book scoring at a higher level than another is definitely more difficult, but to say that one is more suitable for a college senior rather than a college sophomore is inappropriate. To determine college norms is difficult because of the wide divergences of academic qualifications of the students. College reading is also geared to the interests and academic pursuits of the individuals. Fry has stated that high motivation overcomes

high readability levels, whereas low motivation demands a low readability level.

McCuaig and Hutching conducted research and suggested new procedures (based on Fry's Graph) to estimate the internal readability variation of a book.

In the late seventies, Fitzgerald conducted a study using Fry's Graph and the entire prose content of thirty-six basal workbooks used in grades four, five, and six. The findings indicated that the readability exceeded the publishers designated readability by one or two grade levels. It was concluded that by using Fry's sample size of three inadequacies result, and by doing so there is a high risk of mis-matching reading materials and students.

In an article Klare stressed that readability formulas are necessary to measure and predict readability, but they don't indicate causes of difficulty or how to write readably.

In the early sixties Arnsdorf investigated four elementary school social studies series to determine levels of readability within and between books of a series. The Spache Readability Formula for Primary Grade Materials and the Dale-Chall Formula for Predicting Readability were used. Each of these is based on the percentage of unfamiliar words and average sentence length. The results indicated that the readability level in most cases progressed according to the publishers recommended sequence. There were however irregularities both within and between the texts. Reading

level differences were great between primary and intermediate grade texts, and also within the texts themselves. It was noted that teachers would have to adjust the differences in the books to the individual differences within the class.

Johnson and Vardian in the early seventies also stressed the need for the content area teacher to alter the materials used according to the needs of the students. By finding the students reading level and the books reading level, and knowing the students attitudes and abilities, would help the teacher insure the success of each student. They maintained that a social studies (or any content area lesson) should be as well prepared as a reading lesson. Preparations should include motivation, concept development, building of needed vocabulary, reading of directions, and a followup evaluation. This was based in part on the fact that at least half the children in an average classroom would have some difficulty in reading the textbook.

Johnson and Vardians' study evaluated the reading levels of social studies books used in grades one through six. It was determined by using the Spache Readability Formula for grades one, two, and three, and the Readability Graph by Fry. For grades four, five, and six, the Dale-Chall Formula, the Fry Readability Graph, and the Flesch Formula were used. The findings indicated that some of the textbooks were appropriate to the average reader but most would require above average reading ability. There weren't any books for the slow or low-achieving child.

In 1977 Johnson came to the conclusion that reading levels in all grades decreased between 1970 and 1976. The range of reading levels in each book was lower in 1976 than in previous years.

In 1979 Williams evaluated the reading levels of math texts used in grades one through six. By using the Fry Readability Formula Extended and the Magginnis Formula she found that the publishers readability levels were inaccurate. There were few books appropriate for the average, slow and low achieving child. Most of the books were beyond the grade level they were used for.

Langan, in 1980 studied the readability levels of first and second grade basal readers and found that most of them did not correspond to the publishers data for readability. The Fry Readability Graph was used for this study.

Sloan in a study of fourth, fifth, and sixth grade basal readers used the Fry Readability Formula. It was found that there were wide variations in readability from story to story within the texts.

Kapotola, in 1980 surveyed seventh grade textbooks using the Fry Readability Formula and found that there was an inconsistency of reading levels within the books and the designation of readability levels by publishers was not always accurate.

Most of the studies revealed differences in reading levels within the books studied, and also the authors designation of them. In order to avoid difficulties,

textbooks should be chosen more wisely using one or more readability formulas. Teachers should adopt various methods and media to adjust to the reading levels of all students within a class.

There have been several studies done on the readability of college textbooks during the last decades.

The purpose of a study done by Major and Collette in the early fifties was to determine whether the difficulties encountered by biology students was due in part to their inability to understand their reading materials. The Flesch Reading-Ease Formula was used to evaluate the textbooks currently used in college biology classes throughout the nation. They found that the most commonly used biology books were written beyond the reading comprehension level of college freshmen. Major and Collette recommended that readability should be included as a criteria in textbook selection. Students should also be given help in understanding the more difficult parts of the book they were using.

In 1968 Creamers' study done at a community college found that the average student was reading at an eighth grade level. The textbooks being used were written at an average level of between grades fourteen and sixteen.

McClellan, in 1970 applied the Dale-Chall Readability Formula to textbooks used at a Florida community college. He found that eight had reading levels above sixteen, four at reading levels thirteen to fifteen, six at levels eleven and twelve, and two at levels nine and ten. He determined

that half of the books were inappropriate for the students.

Hagstrom used the Dale-Chall Formula to determine the readability of twenty-nine texts used at a California community college. He found that six were at the sixteenth level, nine at the thirteenth to fifteenth level, ten at the eleventh and twelfth level, and four at the ninth and tenth level. He noted that half of the books were inappropriate for the students.

Gibson, in 1971, at a California community college administered the Nelson-Denny Reading Test and found that sixty-five percent of the students had poor reading ability, twenty-four percent were average, and eleven percent superior. This meant that sixty-five percent of the students were at the frustration level in reading.

Another community college study was done in the early seventies by Cline. He compared the readability of community college textbooks with the reading levels of the students who used them. The reading levels of the students were gauged by the Nelson Denny Reading Test, and the readability levels of the books by the Dale-Chall Readability Formula. Seventeen books were compared for the study. Findings indicated that fifty-two percent of the students had reading abilities below the grade level of their textbooks. Cline made the following recommendations: textbooks should be selected more carefully, several texts should be used in a class where reading levels vary, various media as films, tapes, and filmstrips be used as well as the

textbook, and reading skill programs should be instituted in community colleges.

In the early seventies Kurzman found that freshmen at a New York City college had a reading grade level of 10.4. This was based on the results of the Nelson Denny Reading Test that was given to the students. He analyzed twenty-three freshmen social science textbooks using the SMOG Formula. Kurzman found that four were on the freshman level, seven on the fourteenth level, five on the fifteenth level, six on the sixteenth level, and two on the seventeenth level. The books were therefore too difficult for the students to comprehend adequately.

Blair, Outlaw, and Block, found that four out of six textbooks were inappropriate for one-fourth of the student population that they tested in 1976. They used the Nelson Denny Reading Test and the Dale-Chall Readability Formula for their study.

Bertalan, in 1977, at a Florida community college tested three hundred and seventy-five students with the Nelson Denny Reading Test. He found the average reading grade placement was 12.44. Bertalan analyzed twelve social studies texts using the Dale-Chall Readability Formula. He concluded that social studies books were more readable then, than in the five to ten previous years.

Fox tested students at East Texas State University in 1977 using the Nelson Denny Reading Test. The Flesch Reading-Ease Formula and the S.M.O.G. Grading Formula were

used to find the readability level of the textbooks. He determined that the majority of freshmen textbooks were written significantly above the reading ability of the students. Fox found that these books cause anxiety, frustration, and failure. He also agreed with previous writers that the readability of textbooks should be a consideration in their selection. Instructors should also make adjustments in their teaching techniques to meet the needs of the students.

Lane and Riedler, in a study conducted at Kean College in 1980, used the Dale-Chall and Flesch Formulas to determine the readability level of freshmen textbooks. They found that some textbooks were written at the thirteenth to fifteenth grade level and were therefore too difficult for the majority of the students.

In 1980, Santa and Burstyn analyzed several editions of two textbooks used at Rutgers University. They used the Flesch Readability Formula. Santa and Burstyn determined that earlier editions of the same book were fairly difficult (tenth to twelfth grade reading level) whereas recent editions were even more difficult (thirteenth to sixteenth grade level).

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